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ACTIVITIES IN NUCLEAR RESEARCH

CYCLOTHON BEING BUILT -- Izvestiya, 18 Jun 40

Leningrad, 17 June -- In the yard of the Physico-Technical Institute of the Academy of Sciences USSR, a building is being erected to house a gigantic cyclotron, the most powerful in Europe. This apparatus will enable Soviet scientists to study the interaction of the particles that make up the nucleus.

As a result of the combined activity of powerful magnets and electrical fields, the ions of light gases in the vacuum will be moved in a spiral with increasing speeds, which will reach 30,000 kilometers per second, 1/10 of the speed of light. Flying at such colossal speeds, the stream of ions will smash the atomic nuclei of the elements under study, during which each "splinter" or "fragment" becomes the nucleus of a new element.

Under the action of this stream of ions, the majority of bombarded substances becomes radioactive, that is, they acquire the properties of radium. Thus, another problem is solved: the replacement of natural radium, a gram of which cost one million rubles, by artificial radioactive elements.

The distinctive outlines of a dome-shaped tower, adjoining a two-story building, are already visible. Under the dome of the glass and metal tower, will be set up the powerful electromagnet weighing more than 75 tons. The generators supplying the magnets will also be located here. Close to the cyclotron building can be seen the framework of a special transformer substation.

The "Bol'shevik," "Russkiy Dizel'," "Electrosila," and "Krasniy Vyborzhets" factories are participating in the construction of the cyclotron.

Assembly of the equipment will begin in September and in 1941 the cyclotron will be placed at the disposal of scientists.

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STUDY OF ISOTOPES INCREASED -- Industriya, 28 Aug 40

During the past years, scientists have revealed the great theoretical and practical significance of isotopes in analytical chemistry, biology, medicine, etc. In the scientific institutes of Europe and America, great work is in progress on the study of isotopes.

In the USSR these problems have been taken up by several scientific institutes: Biogeochemical Laboratory of the USSR Academy of Sciences, Radium Institute, Physico-Chemical Institute imeni Pisarzhevskiy of the Academy of Sciences USSR, and others.

S. I. Vol'fkovich, Corresponding Member of the Academy, spoke on his subject at the last meeting of the USSR Academy of Sciences.

The Presidium of the Academy of Sciences decided to increase the scientific research work on the chemistry of isotopes. It was deemed essential to construct a large mass-spectograph for analyzing and separating isotopes. It is necessary to construct a powerful cyclotron in Moscow along the lines of the cyclotron now under construction at the Leningrad Physico-Technical Institute.

The Presidium of the Academy of Sciences considers it necessary to establish a fund or "bank" of pure isotopes of calcium, strontium, barium, meso-thorium, etc.

It is necessary to push the construction of equipment for obtaining heavy water on an industrial scale at the Chirchik Nitrogen Fertilizer Combine, which is now being organized.

BUILDING THIRD SOVIET CYCLOTRON -- Izvestiya, 23 Oct 40

It has been decided to proceed with the building of the third and most powerful Soviet cyclotron, to be used to obtain deuterons (the nucleus of heavy-water, hydrogen D_2) with a power of 50 Mev. It is interesting to note that the most powerful cyclotron existing now in the world gives deuterons with an energy of 16 Mev.

The work of erecting the new cyclotron has been included in the 1941 Plan.

The new powerful Soviet cyclotron will be set up in Moscow in the area of the new building of the Physical Institute (Kaluzhskoye Chaussee). A special chamber of about 8,000 cubic meters will accommodate the cyclotron compartment and laboratory. The weight of the cyclotron magnet will be 1,000 tons. The diameter of the magnet's poles will be about 3 meters.

CONFERENCE DISCUSSES ATOMIC NUCLEUS -- Izvestiya, 21 Nov 40

Yesterday at Moscow Hall of the Academy of Sciences USSR the annual conference devoted to nuclear physics discussed the physics of the atomic nucleus.

D. V. Skobel'tsin, Corresponding Member of the Academy, opened the conference by reviewing the works of the physicists during the past year and discussing the problems arising therein.

The first day of the conference was dedicated to the works of Prof L. D. Landau (Institute of Physical Problems) and I. Ye. Tamm, Corresponding Member of the Academy, (Physical Institute imeni Lebedev). Their work, concerning one of the most interesting questions of physics, the problem of nuclear forces, was the subject of extensive discussion.

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The atomic nucleus consists of two sorts of particles: protons and noncharged particles called neutrons. These [illegible] property of attraction for each other if they come very close [illegible] meson, a particle discovered in 1938 by the Americans Anderson [illegible] who received the Nobel Prize for this discovery, is the carrier [illegible] of attraction. According to the theory of Landau and Tamm, as a result of electrical attraction of the meson and proton, the meson must approach the proton at a distance equal to its radius. Because of this, the proton turns into a neutron.

The development of these ideas promises explanation of particle bonds in nuclei by electrical forces alone. Then the necessity for assuming the existence of some special forces, whose presence has been assumed up to the present, is eliminated.

Professor Landau presented a paper on another of his projects dedicated to the problem of the radius of the electron and meson.

This work permits the study of processes which occur with mesons having very great energies. The study of these processes was impossible with present methods. The problem long ago attracted the attention of many scientists, but not until now, in the work of Landau, has this problem finally been solved.

More than 200 scholars, including delegates from the most advanced institutions of Latvia, Lithuania, and Moldavia, participated in the conference.

WORK BEGUN ON KHAR'KOV CYCLOTRON -- Izvestiya, 29 Apr 41

Khar'kov, 28 April -- In the Physico-Technical Institute of the Academy of Sciences Ukrainian SSR preparatory work has begun on the construction of a powerful cyclotron. The Ukrainian cyclotron will be considerably more powerful than the one in Leningrad. Its basic part is the tremendous electromagnet which will weigh more than 220 tons.

This cyclotron will be ready for operation in 1942. It will supply up to 25 million volts for neutron streams and up to 50 million volts for alpha particles. Academician A. I. Leypunskiy is directing the construction of the cyclotron.

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